

UTICAJ LIKVIDNOSTI NA PROFITABILNOST PREDUZEĆA PRERAĐIVAČKOG SEKTORA U R. SRBIJI

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Apstrakt

Predmet ovog rada je ispitivanje uticaja likvidnosti na profitabilnost 100 preduzeća prerađivačkog sektora R. Srbije sa najvišim nivoom poslovnih prihoda u periodu od 2016. do 2020. godine. Na panel podatke primenjena je regresija sa fiksnim efektima. Na osnovu dobijenih rezultata može se tvrditi da ne postoji direktna veza između pokazatelja ubrzane likvidnosti i neto prinosa na aktivu kada su posmatrana preduzeća u pitanju, što implicira da se ne može utvrditi ni optimalan iznos gotovine i gotovinskih ekvivalenta koji bi omogućio maksimiranje neto prinosa na aktivu. Direktna veza ne postoji ni između profitabilnosti i dužine trajanja poslovnog ciklusa posmatranih preduzeća. S druge strane, brži obrt kapitala za posledicu ima viši nivo profitabilnosti, kao i rast aktive preduzeća, dok veća zaduženost ima negativne implikacije na profitabilnost preduzeća prerađivačkog sektora. Dobijeni rezultati imaju značajne implikacije na odluke finansijskih menadžera, na finansijski sektor, kao i na nadležne državne institucije.

Ključne reči: profitabilnost, ROA, likvidnost, panel analiza

JEL: C22, C23, G30, G32

Uvod

Cilj osnivanja svakog preduzeća je maksimizacija profita, koja je nužna za njegov dugoročan rast i razvoj. Nakon svetske ekonomske krize 2008. godine finansijski menadžeri uvideli su da je, pored maksimizacije profita, potrebno ozbiljno razmotriti i pitanje likvidnosti (Bigio, 2015; Lang i Maffet, 2011, Raykov, 2017). Stoga se kao jedan od najvažnijih zadataka finansijskih menadžera nameće

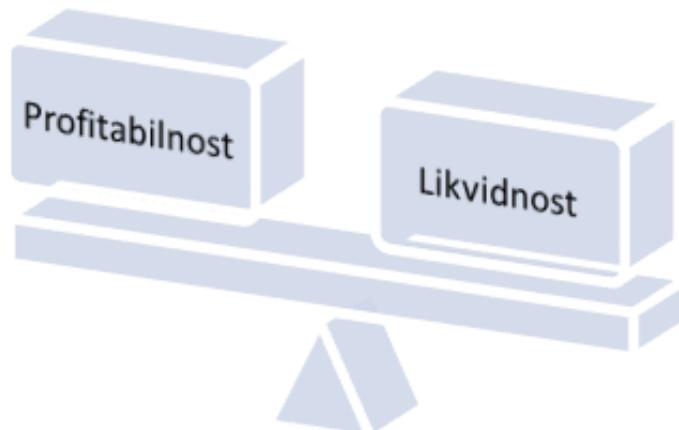
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određivanje optimalne finansijske strukture koja je determinisana težnjom za višim nivoom profitabilnosti uz obezbeđenje nužnog nivoa likvidnosti (Slika 1).

Slika 3: Optimalan odnos likvidnosti i profitabilnosti preduzeća



Izvor: prilagođeno prema Balaban (2022)

Postoje dva različita pristupa koji teorijski objašnjavaju odnos između likvidnosti i profitabilnosti. Prema prvom pristupu, viši nivo likvidnosti dovodi do povećanja troškova, odnosno visokih oportunitetnih troškova, što može imati negativan uticaj na profitabilnost. Međutim, ovaj uticaj je verovatno kratkotrajne prirode. Hirigoyen (1985) je otkrio da na srednji i dugi rok postoji mogućnost pozitivnog odnosa između likvidnosti i profitabilnosti jer bi niska likvidnost prouzrokovala nisku profitabilnost, budući da za posledicu ima veći broj zahteva za kreditima i nedovoljan tok gotovine. Slično tome, Hollmayr i Kühl (2019) smatraju da aktivno upravljanje likvidnošću ima pozitivan uticaj na profitabilnost dok Bakić i Petković (2020) tvrde da su i likvidnost i profitabilnost podjednako važne komponente za egzistenciju preduzeća i maksimizaciju vrednosti preduzeća (Knauer, 2013). Naime, viši nivo likvidnosti pozitivan je pokazatelj finansijskog stanja preduzeća, te iako kratkoročno posmatrano, viši nivo likvidnosti može imati negativan uticaj na profitabilnost, na srednji i dugi rok on će povećati profitabilnost preduzeća i minimizirati rizik od bankrota. Gonçalves i autori (2018) smatraju da je pronalaženje ravnoteže između profitabilnosti i likvidnosti jedan od glavnih izazova upravljanja poslovnim finansijama. S tim u vezi, predmet istraživanja ovog rada je analiza odnosa likvidnosti i profitabilnosti preduzeća prerađivačkog sektora u Republici Srbiji, dok je cilj kvantitativno determinisanje uticaja likvidnosti na profitabilnost posmatranih preduzeća. U skladu sa dostupnom teorijskom i empirijskom literaturom postavljene su sledeće hipoteze:

H_1 : Između likvidnosti i profitabilnosti postoji direktni odnos

H_2 : Viši nivo likvidnosti podrazumeva niži nivo profitabilnosti

H_3 : Postoji optimalan nivo likvidne imovine za svako preduzeće.

Većina dostupnih empirijskih istraživanja dokazala je postojanje odnosa između likvidnosti i profitabilnosti (tabela 1), te je u skladu sa tom činjenicom formirana prva hipoteza. Iako dostupna teorijska literatura ukazuje na dugoročno pozitivan odnos likvidnosti i profitabilnosti, naša pretpostavka jeste da viši nivo likvidne imovine implicira nižu stopu profitabilnosti. Na ovakvu pretpostavku, odnosno definiciju druge hipoteze, navele su nas studije koje su analizirale pomenuti odnos na primeru preduzeća u okruženju (Raykov, 2017; Vuković i Jakšić, 2019). Rezultati studije koju su sproveli Korent i Orsag (2018) impliciraju postojanje veze između neto obrtnog kapitala i prinosa na sredstva. Ovo ukazuje na postojanje optimalnog nivoa neto obrtnog kapitala, odnosno u našem slučaju likvidne imovine koja balansira troškove i koristi i maksimizira profitabilnost analiziranih preduzeća. U skladu sa pomenutim rezultatima definisana je treća hipoteza. U svakom preduzeću treba izvršiti optimizaciju nivoa obrtnih sredstava, što povlači za sobom potrebu održavanja ravnoteže između dva naizgled suprotna cilja, profitabilnosti i likvidnosti (Van Horne i Wachowicz, 2009; Bieniasz i Gołaś, 2011; Gołaś, 2020).

Pregled literature

Odnos likvidnosti i profitabilnosti privukao je pažnju velikog broja autora, a rezultati određenog broja empirijskih studija predstavljeni su u Tabeli 1.

Kao što se može videti iz tabele, većina autora je primenjivala regresiju i/ili kointegraciju na panel podatke, odnosno posmatrani uzorak većeg broja preduzeća. Ono što je jasno, jeste da ne postoji konsenzus u vezi odnosa likvidnosti i profitabilnosti preduzeća. S tim u vezi, cilj ovog rada je kvantitativno determinisanje uticaja likvidnosti na profitabilnost preduzeća prerađivačkog sektora u Republici Srbiji, što ujedno predstavlja i naučni doprinos ovog rada.

Tabela 1: Rezultati dosadašnjih empirijskih studija

Autor(i)	Uzorak	Period	Metodologija	Rezultati
Mazanec (2022)	3828 transportnih preduzeća iz zemalja Višegradske grupe	2019	Korelacija i regresija	Različiti rezultati
Milošev (2021)	367 nefinansijskih preduzeća iz R. Srbije	2016-2019	PCSE	Pozitivan odnos
Kryszak i autori (2021)	477 farmi iz EU	2007-2018	SYS-GMM	Ne postoji odnos
Högerle i autori (2020)	115 kompanija kotiranih na FSE	2011-2017	Regresija	Pozitivan odnos
Gołaś (2020)	Mlekare u Poljskoj	2008-2017	Regresija	Negativan odnos
Seth i autori (2020)	563 indijskih proizvodnih preduzeća	2008-2018	FE regresija	Negativan odnos
Al-Homaidi i autori (2020)	2154 indijskih preduzeća	2010-2016	Regresija	Različiti rezultati
Olaoye (2020)	Prehrambene kompanije koje se kotiraju na NSE	2014-2018	Regresija i korelacija	Ne postoji odnos

Li i autori (2020)	15 nefinansijskih preduzeća kotiranih na GSE	2008-2017	Kointegracija	Negativan odnos
Yameen i autori (2019)	82 farmaceutske kompanije kotirane na BSE	2008-2017	Regresija	Pozitivan odnos
Alsulayhim (2019)	67 kompanija kotiranih na SSE	2007-2016	Regresija i kointegracija	Pozitivan odnos
Hossain i Alam (2019)	6 kompanija iz cementne industrije kotirane na DSE	2013-2017	Pearsonova korelacija	Negativan odnos
Ren i autori (2019)	Kineska proizvodna preduzeća koja se kotiraju na berzi	2010-2017	FE regresija	Negativan odnos
Vuković i Jakšić (2019)	9883 prehrambene kompanije iz jugoistočne Evrope	2010-2014	Probit regresija	Negativan odnos
Asche i autori (2018)	Norveške odgajivačnice lososa	2000-2014	Konitegracija i regresija	Ne postoji odnos
Korent i Orsag (2018)	442 hrvatske IT i konsalting kompanije	2008-2013	Kointegracija i regresija	Negativan odnos
Alom (2018)	Nefinansijske kompanije kotirane na DSE	1998-2013	Kointegracija	Pozitivan odnos
Gonçalves i autori (2018)	400 velikih i srednjih preduzeća iz VB koje se ne kotiraju na berzi	2006-2014	Regresija	Pozitivan odnos
Nanda i Panda (2018)	173 proizvodna preduzeća koja se kotiraju na BSE	2000-2015	Panel GLS i VAR	Pozitivan odnos

Izvor: sistematizacija autora

Tabela 1 – nastavak: Rezultati dosadašnjih empirijskih studija

Autor(i)	Uzorak	Period	Metodologija	Rezultati
Bođoc i Anton (2017)	937 brzo rastućih kompanija iz centralne, istočne i jugoistočne Evrope	2006-2015	GMM	Negativan odnos
Evci i Sak (2017)	41 kompanija kotirana na BIST	2005-2016	Regresija	Negativan odnos
Raykov (2017)	20 kompanija kotiranih na BSE (Bulgarian SE)	2007-2015	Kointegracija i regresija	Negativan odnos
Al-Jafari i Al Samman (2015)	17 industrijskih kompanija listiranih na MSM	2006-2013	Regresija	Negativan odnos
Kandpal (2015)	10 indijskih infrastrukturnih kompanija	2007-2015	Korelacija i regresija	Različiti rezultati

Izvor: sistematizacija autora

Podaci i metodologija

Uzorak se sastoji od 100 preduzeća prerađivačkog sektora sa najvišim nivoom poslovnih prihoda sa teritorije Republike Srbije, a vremenski obuhvat istraživanja je period od 2016. do 2020. godine. Prilikom razmatranja uticaja likvidnosti na profitabilnost preduzeća, većina empirijskih studija je koristila regresioni model (tabela 1), pa su se i autori opredelili za ocenu regresionog modela. Sledeći Milošev (2021), Nanda i Panda (2018), Gonçalves i autori (2018) i Knauer i Wöhrman (2013) u radu je kao mera profitabilnosti korišćen pokazatelj ROA. Kao mera likvidnosti korišćen je pokazatelj ubrzane likvidnosti, budući da se samo likvidna sredstva mogu koristiti u relativno kratkom vremenskom periodu za izmirenje preuzetih kratkoročnih obaveza preduzeća. Istu meru likvidnosti koristili su i Milošev (2021), Bočić i Anton (2017), kao i Raykov (2017). Kako bi se dobili relevantni rezultati u regresioni model su unete kontrolne varijable. S tim u vezi, ocenjen je sledeći regresioni model:

$$ROA_{it} = \beta_1 LIK_{it} + \beta_2 DEBT_{it} + \beta_3 WCM_{it} + \beta_4 ACT_{it} + \beta_5 SIZE_{it} + \alpha_i + \epsilon_{it}$$

$$\alpha_i = \mu + \gamma_i$$

pri čemu je:

ROA_{it} – neto prinos na aktivu, odnosno mera profitabilnosti preduzeća,

$DEBT_{it}$ – racio duga i kapitala, odnosno mera zaduženosti preduzeća,

WCM_{it} – vreme trajanja poslovnog ciklusa, odnosno aproksimacija uspešnosti upravljanja obrtnim kapitalom,

ACT_{it} – koeficijent obrta kapitala, odnosno pokazatelj aktivnosti preduzeća i

$SIZE_{it}$ – prva differenca prirodnog logaritma vrednosti aktive, odnosno mera veličine preduzeća,

α_i – odsečak, varira među pojedinačnim jedinicama posmatranja, ali je konstantan tokom vremena. Sastoje se od konstantnog dela (μ) i termina greške za pojedinačne jedinice posmatranja (γ_i),

ϵ_{it} – greška modela.

Deskriptivna statistika posmatranih varijabli 100 prerađivačkih preduzeća sa najvišim nivoom poslovnih prihoda u Republici Srbiji u periodu od 2016. do 2020. godine predstavljena je u tabeli 2.

Tabela 2: Deskriptivna statistika

	ROA	LIK	DEBT	WCM	ACT	SIZE
Mean	0.076713	1.325527	2.741983	75.23207	4.569831	9.902181
Median	0.069500	0.900000	1.000000	54.00000	2.400000	9.924504
Max	0.591000	11.60000	159.3000	651.0000	124.7000	10.99446
Min	-0.631000	0.000000	0.000000	-669.0000	0.400000	8.455786
St. Dev.	-0.110303	1.392566	9.341054	123.3299	8.955761	0.392289

Izvor: kalkulacija autora na osnovu podataka APR-a, EViews program

Rezultati rada sa diskusijuom

Korelaciona analiza je sprovedena kako bi se otkrio eventualni problem multikolinearnosti koji može da dovede do pogrešne interpretacije ocenjenih parametara. Na osnovu tabele 3 može se zaključiti da između posmatranih nezavisnih varijabli ne postoji korelacioni odnos, što implicira odsustvo multikolinearnosti u ocjenjenom regresionom modelu.

U cilju testiranja stacionarnosti posmatranih varijabli sprovedeni su testovi jediničnog korena (Levin, Lin, Chu i IPS test). Kako bi se utvrdilo da li je na posmatrane varijable primereno primeniti test jediničnog korena prve ili druge generacije, sproveden je i test međuzavisnosti (Pesaran CD test), a rezultati dobijenih testova prikazani su u tabeli 4.

Tabela 3: Korelaciona matrica

	ROA	LIK	DEBT	WCM	ACT	SIZE
ROA	1.000000	0.215900	-0.189275	0.053742	0.176536	-0.070089
LIK	0.215900	1.000000	-0.139458	0.249664	-0.057682	-0.058240
DEBT	-0.189275	-0.139458	1.000000	-0.029278	-0.061399	0.003790
WCM	0.053742	0.249664	0.249664	1.000000	-0.256425	0.114399
ACT	0.176536	-0.057682	-0.061399	-0.256425	1.000000	-0.503348
SIZE	-0.070089	-0.058240	-0.003790	0.114399	-0.503348	1.000000

Izvor: kalkulacija autora na osnovu podataka APR-a, EViews program

Tabela 4: Test međuzavisnosti i testovi jediničnog korena

Test/ Varijable	Pesaran CD	Levin, Lin and Chu			IPS	
		none	individual intercept	in. intercept and trend	individual intercept	in. intercept and trend
ROA	0.715861 (0.4741)	-8.93573 (0.0000)	-31.3427 (0.0000)	-24.3550 (0.0000)	-10.4610 (0.0000)	-11.1931 (0.0000)
LIK	- 0.970247 (0.3319)	-6.67467 (0.0000)	1.239930 (0.8924)	-96.6276 (0.0000)	-2.73695 (0.0031)	-9.0e+11 (0.0000)
DEBT	0.851633 (0.4012)	-15.8839 (0.0000)	-0.07486 (0.4702)	-318.283 (0.0000)	-2.8e+14 (0.0000)	-7.1e+13 (0.0000)
WCM	1.560188 (0.1187)	-3.93235 (0.0000)	-110.476 (0.0000)	-63.4740 (0.0000)	-14.2062 (0.0000)	-5.41119 (0.0000)
ACT	1.274329 (0.2057)	-17.3259 (0.0000)	-337.830 (0.0000)	-83.5527 (0.0000)	-37.0798 (0.0000)	-1.9e+12 (0.0000)
dSIZE	- 0.813611 (0.4159)	-10.8386 (0.0000)	-7.54897 (0.0000)			

Izvor: kalkulacija autora na osnovu podataka APR-a, EViews program

Napomena: Pesaran CD test međuzavisnosti – H_0 : Ne postoji međuzavisnost; Levin, Lin and Chu test jediničnog korena – H_0 : Postoji individualni jedinični koren; IPS test jediničnog korena – H_0 : Postoji zajednički jedinični koren.

Na osnovu dobijenih rezultata iz tabele 4, može se zaključiti da u pojedinačnim posmatranim varijablama ne postoji međuzavisnost, što implicira upotrebu testova jediničnog korena prve generacije. Autori su se opredelili za Levin, Lin i Chu test i IPS test, budući da pomenuti testovi imaju drugačije nulte hipoteze i mogu da služe kao provera jedan drugom. Na osnovu sprovedenih testova jediničnog korena (tabela 4), može se tvrditi da su sve posmatrane varijable, osim veličine preduzeća, stacionirane. Varijabla koja iskazuje veličinu preduzeća stacionarana je u prvoj diferenci, pa će ona kao takva biti uključena u model.

Hausman test pokazuje da je adekvatno koristiti regresioni model sa fiksним efektima. Rezultati sprovedene FE regresije predstavljeni su u tabeli 5.

Sudeći prema dobijenim rezultatima, likvidnost nema uticaja na profitabilnost najvećih preduzeća prerađivačkog sektora u R. Srbiji, što implicira da ne postoji direktna veza između profitabilnosti i likvidnosti, kao i da ne postoji optimalan iznos gotovine i gotovinskih ekvivalenta koji bi omogućio maksimiranje neto prinosa na aktivu.

Tabela 5: Ocenjen regresioni model sa fiksним efektima

Varijable	Koeficijent	Verovatnoća
c	0.049238	0.0001
LIK	0.005319	0.4263
DEBT	-0.005652	0.0001
WCM	-6.01e-05	0.4351
ACT	0.005794	0.0007
dSIZE	0.302544	0.0000
Effect specification		
R-squared		0.688366
Adjusted R-squared		0.575246
F-statistic		6.085280
Prob (F-statistic)		0.000000

Izvor: kalkulacija autora na osnovu podataka APR-a, EViews program

Profitabilnost, iskazana pokazateljem ROA, nije povezana ni sa dužinom trajanja poslovnog ciklusa posmatranih preduzeća. S druge strane, veća zaduženost preduzeća prerađivačkog sektora u R. Srbiji negativno utiče na profitabilnost preduzeća, dok brži obrt kapitala i veća aktiva preduzeća ima pozitivan uticaj na neto prinos na aktivu u posmatranom periodu.

Zaključak

O odnosu likvidnosti i profitabilnosti preduzeća ne postoji jedinstveno mišljenje. Prema jednom pristupu, odnos između dve varijable je negativan, budući da viša likvidnost iziskuje viši nivo oportunitetnih troškova i onemogućava nova ulaganja. Međutim, pojedini autori tvrde da je ovakav odnos prisutan samo kada se dve varijable posmatraju u kratkom roku. U dugom i srednjem roku, likvidnost i profitabilnost kreću se u istom pravcu. Drugim rečima, preduzeća koja imaju

problem sa likvidnošću u srednjem i dugom roku ne mogu biti profitabilna. S tim u vezi, cilj ovog rada je kvantitativno determinisanje uticaja likvidnosti na profitabilnost 100 preduzeća prerađivačkog sektora u Republici Srbiji sa najvišim nivoom poslovnih prihoda posmatrano u petogodišnjem periodu.

Polazne hipoteze su formirane na osnovu dostupne teorijske i empirijske literature i testirane na panel podacima uz pomoć regresije sa fiksnim efektima. Dobijeni rezultati ukazuju da ne postoji direktna veza između pokazatelja ubrzane likvidnosti i neto prinosa na aktivu kada su posmatrana preduzeća u pitanju, što implicira da se ne može utvrditi ni optimalan iznos gotovine i gotovinskih ekvivalenta koji bi omogućio maksimiranje neto prinosa na aktivu. Direktna veza ne postoji ni između profitabilnosti i dužine trajanja poslovnog ciklusa posmatranih preduzeća. Može se tvrditi da brži obrt kapitala za posledicu ima viši nivo profitabilnosti, kao i rast aktive preduzeća. S druge strane, veća zaduženost ima negativne implikacije na profitabilnost preduzeća prerađivačkog sektora.

Rezultati sprovedenog istraživanja imaju značajne implikacije na finansijski menadžment preduzeća prerađivačkog sektora u R. Srbiji u cilju donošenja adekvatnih poslovnih odluka kada je povećanje profitabilnosti u pitanju. Dobijeni rezultati mogu biti od koristi i finansijskom sektoru prilikom donošenja odluka o odobravanju kredita preduzećima prerađivačkog sektora, kao i nadležnim institucijama koje pružaju podršku posmatranim preduzećima.

Sugestije za buduća istraživanja odnose se na korišćenje alternativnih mera pojedinih pokazatelja finansijske analize, pre svega likvidnosti i profitabilnosti, kako bi dobijeni rezultati bili još pouzdaniji. Druga sugestija odnosi se na proširenje perioda posmatranja, budući da se kao ograničenje ove studije može navesti relativno slaba javna dostupnost podataka vremenske serije (petogodišnji period) finansijskih izveštaja.

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THE INFLUENCE OF LIQUIDITY ON THE PROFITABILITY OF COMPANIES IN THE PROCESSING SECTOR IN THE RURAL SERBIA

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Original scientific paper

Abstract

The subject of this paper is the examination of the impact of liquidity on the profitability of 100 companies in the processing sector of the Republic of Serbia with the highest level of business income in the period from 2016 to 2020. A regression with fixed effects was applied to the panel data. Based on the obtained results, it can be argued that there is no direct relationship between indicators of accelerated liquidity and net return on assets when it comes to the observed companies, which implies that the optimal amount of cash and cash equivalents that would enable the maximization of net return on assets cannot be determined either.. There is no direct connection between profitability and the length of the business cycle of the observed companies. On the other hand, a faster turnover of capital results in a higher level of profitability, as well as the growth of company assets, while higher indebtedness has negative implications for the profitability of companies in the processing sector. The obtained results have significant implications for the decisions of financial managers, for the financial sector, as well as for competent state institutions.

Keywords: profitability, ROA, liquidity, panel analysis

JEL: C22, C23, G30, G32

Introduction

The goal of establishing any company is profit maximization, which is necessary for its long-term growth and development. After the world economic crisis in 2008, financial managers realized that, in addition to profit maximization, it is necessary to seriously consider the issue of liquidity (Bigio, 2015; Lang and Maffet, 2011, Raykov, 2017). Therefore, one of the most important tasks of financial managers is determining the optimal financial structure, which is

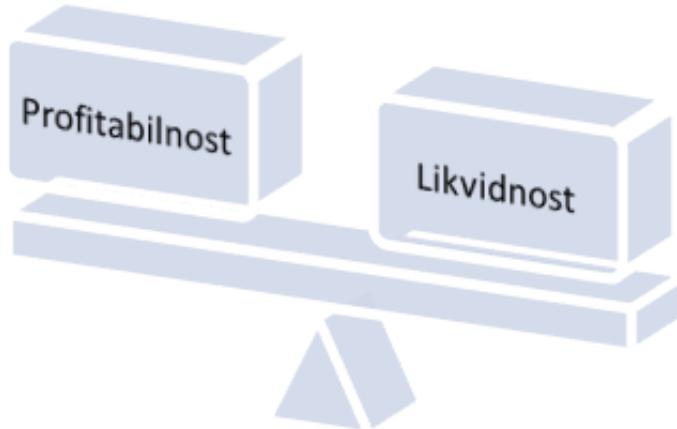
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determined by striving for a higher level of profitability while ensuring the necessary level of liquidity (Figure 1).

Figure 4: Optimal ratio of liquidity and profitability of the company



Source: adapted from Balaban (2022)

There are two different approaches that theoretically explain the relationship between liquidity and profitability. According to the first approach, a higher level of liquidity leads to an increase in costs, i.e. high opportunity costs, which can have a negative impact on profitability. However, this impact is likely to be short-lived. Hirigoyen (1985) found that in the medium to long term there is a possibility of a positive relationship between liquidity and profitability because low liquidity would cause low profitability, since it results in more loan requests and insufficient cash flow. Similarly, Hollmayr and Kühl (2019) believe that active liquidity management has a positive impact on profitability, while Bakić and Petković (2020) claim that both liquidity and profitability are equally important components for the existence of the company and the maximization of the company's value (Knauer, 2013). Namely, a higher level of liquidity is a positive indicator of the company's financial condition, and although in the short term, a higher level of liquidity can have a negative impact on profitability, in the medium and long term it will increase the profitability of the company and minimize the risk of bankruptcy. Gonçalves and authors (2018) consider that finding a balance between profitability and liquidity is one of the main challenges of managing business finances. In this regard, the subject of research in this paper is the analysis of the relationship between liquidity and profitability of companies in the processing sector in the Republic of Serbia, while the goal is to quantitatively determine the impact of liquidity on the profitability of the observed companies. In accordance with the available theoretical and empirical literature, the following hypotheses were set:

H₁: There is a direct relationship between liquidity and profitability

H₂: A higher level of liquidity implies a lower level of profitability

H₃: There is an optimal level of liquid assets for each company.

The majority of available empirical research proved the existence of a relationship between liquidity and profitability (table 1), and the first hypothesis was formed in accordance with this fact. Although the available theoretical literature indicates a long-term positive relationship between liquidity and profitability, our assumption is that a higher level of liquid assets implies a lower rate of profitability. We were led to this assumption, i.e. the definition of the second hypothesis, by studies that analyzed the mentioned relationship on the example of companies in the environment (Raykov, 2017; Vuković and Jakšić, 2019). The results of a study conducted by Korent and Orsag (2018) imply the existence of a relationship between net working capital and return on assets. This indicates the existence of an optimal level of net working capital, that is, in our case, liquid assets that balance costs and benefits and maximize the profitability of the analyzed companies. In accordance with the mentioned results, the third hypothesis was defined. In every company, the level of working capital should be optimized, which entails the need to maintain a balance between two seemingly opposite goals, profitability and liquidity (Van Horne and Wachowicz, 2009; Bieniasz and Gołaś, 2011; Gołaś, 2020).

Literature review

The relationship between liquidity and profitability has attracted the attention of a large number of authors, and the results of a certain number of empirical studies are presented in Table 1.

As can be seen from the table, most authors applied regression and/or cointegration to panel data, i.e. the observed sample of a larger number of companies. What is clear is that there is no consensus regarding the ratio of liquidity and profitability of the company. In this regard, the goal of this paper is to quantitatively determine the impact of liquidity on the profitability of companies in the processing sector in the Republic of Serbia, which also represents the scientific contribution of this paper.

Table 2: Results of previous empirical studies

Author(s)	A sample	Period of time	Methodology	Results
Mazanec (2022)	3828 transport companies from the Visegrad Group countries	in 2019	Correlation and regression	Different results
Milošev (2021)	367 non-financial companies from the Republic of Serbia	2016-2019	PCSE	A positive relationship
Kryszak et al (2021)	477 farms from the EU	2007-2018	SYS-GMM	There is no relationship
Högerle et al. (2020)	115 companies listed on FSE	2011-2017	Regression	A positive relationship

Gołaś (2020)	Dairies in Poland	2008-2017	Regression	Negative relationship
Seth and the Authors (2020)	563 Indian manufacturing companies	2008-2018	FE regression	Negative relationship
Al-Homaidi and authors (2020)	2154 Indian companies	2010-2016	Regression	Different results
Olaoye (2020)	Food companies listed on NSE	2014-2018	Regression and correlation	There is no relationship
Lee et al (2020)	15 non-financial companies listed on the GSE	2008-2017	Cointegration	Negative relationship
Yameen and the Authors (2019)	82 pharmaceutical companies listed on BSE	2008-2017	Regression	A positive relationship
Alsulayhim (2019)	67 companies listed on SSE	2007-2016	Regression and cointegration	A positive relationship
Hossain and Alam (2019)	6 companies from the cement industry listed on the DSE	2013-2017	Pearson correlation	Negative relationship
Wren and the Authors (2019)	Listed Chinese manufacturing companies	2010-2017	FE regression	Negative relationship
Vuković and Jakšić (2019)	9883 food companies from Southeast Europe	2010-2014	Probit regression	Negative relationship
Asche et al. (2018)	Norwegian salmon farms	2000-2014	Cointegration and regression	There is no relationship
Corent and Orsag (2018)	442 Croatian IT and consulting companies	2008-2013	Cointegration and regression	Negative relationship
Alom (2018)	Non-financial companies listed on the DSE	1998-2013	Cointegration	A positive relationship
Gonçalves and Authors (2018)	400 large and medium-sized companies from the UK that are not listed on the stock exchange	2006-2014	Regression	A positive relationship
Nanda and Panda (2018)	173 manufacturing companies listed on BSE	2000-2015	Panel GLS i VAR	A positive relationship

Source: author's systematization

Table 1- continued: Results of previous empirical studies

Author(s)	A sample	Period of time	Methodology	Results
Boțoc and Anton (2017)	937 fast growing companies from Central, Eastern and Southeastern Europe	2006-2015	GMM	Negative relationship
Evcı and Sak (2017)	41 companies listed on BIST	2005-2016	Regression	Negative relationship
Raykov (2017)	20 companies listed on the BSE (Bulgarian SE)	2007-2015	Cointegration and regression	Negative relationship
Al-Jafari and Al Samman (2015)	17 industrial companies listed on MSM	2006-2013	Regression	Negative relationship
Kandpal (2015)	10 Indian Infrastructure Companies	2007-2015	Correlation and regression	Different results

Source: author's systematization

Data and methodology

The sample consists of 100 companies in the processing sector with the highest level of business income from the territory of the Republic of Serbia, and the time frame of the research is the period from 2016 to 2020. When considering the impact of liquidity on company profitability, most empirical studies used the regression model (table 1), so the authors opted for the regression model assessment. Following Milošev (2021), Nanda and Panda (2018), Gonçalves and authors (2018) and Knauer and Wöhrman (2013), the ROA indicator was used as a measure of profitability in the paper. As a measure of liquidity, the indicator of accelerated liquidity was used, since only liquid funds can be used in a relatively short period of time to settle the assumed short-term obligations of the company. The same measure of liquidity was used by Milošev (2021), Bočić and Anton (2017), as well as Raykov (2017). In order to obtain relevant results, control variables were entered into the regression model. In this regard, the following regression model was evaluated:

$$ROA_{it} = \beta_1 LIK_{it} + \beta_2 DEBT_{it} + \beta_3 WCM_{it} + \beta_4 ACT_{it} + \beta_5 SIZE_{it} + \alpha_i + \epsilon_{it}$$

$$\alpha_i = \mu + \gamma_i$$

whereby:

ROA_{it} - net return on assets, i.e. a measure of the company's profitability,

$DEBT_{it}$ - the ratio of debt to capital, i.e. a measure of the company's indebtedness,

WCM_{it} - the duration of the business cycle, i.e. the approximation of the success of working capital management,

ACT_{it} - the capital turnover ratio, i.e. the indicator of the company's activity

$SIZE_{it}$ - the first difference of the natural logarithm of the asset value, i.e. a measure of the size of the company,

α_i - section, varies among individual units of observation, but is constant over time. It consists of a constant part (μ) and an error term for individual observation units (γ_i),

ϵ_{it} - model error.

Descriptive statistics of the observed variables of 100 processing companies with the highest level of business income in the Republic of Serbia in the period from 2016 to 2020 are presented in Table 2.

Table 2: Descriptive statistics

	ROA	CHARACTER	DEBT	WCM	ACT	SIZE
Mean	0.076713	1.325527	2.741983	75.23207	4.569831	9.902181
Median	0.069500	0.900000	1.000000	54.00000	2.400000	9.924504
Max	0.591000	11.60000	159.3000	651.0000	124.7000	10.99446
Min	-0.631000	0.000000	0.000000	-669.0000	0.400000	8.455786
St. Dev.	-0.110303	1.392566	9.341054	123.3299	8.955761	0.392289

Source: author's calculation based on APR data, EViews program

Results of work with discussion

Correlation analysis was conducted in order to detect the possible problem of multicollinearity that can lead to a wrong interpretation of the estimated parameters. Based on Table 3, it can be concluded that there is no correlation between the observed independent variables, which implies the absence of multicollinearity in the estimated regression model.

In order to test the stationarity of the observed variables, unit root tests (Levin, Lin, Chu and IPS test) were conducted. In order to determine whether it is appropriate to apply the unit root test of the first or second generation to the observed variables, an interdependence test (Pesaran CD test) was also conducted, and the results of the obtained tests are shown in table 4.

Table 3: Correlation matrix

	ROA	CHARACTER	DEBT	WCM	ACT	SIZE
ROA	1.000000	0.215900	-0.189275	0.053742	0.176536	-0.070089
CHARACTER	0.215900	1.000000	-0.139458	0.249664	-0.057682	-0.058240
DEBT	-0.189275	-0.139458	1.000000	-0.029278	-0.061399	0.003790
WCM	0.053742	0.249664	0.249664	1.000000	-0.256425	0.114399
ACT	0.176536	-0.057682	-0.061399	-0.256425	1.000000	-0.503348
SIZE	-0.070089	-0.058240	-0.003790	0.114399	-0.503348	1.000000

Source: author's calculation based on APR data, EViews program

Table 4: Interdependence test and unit root tests

Test/ Variables	Pesaran CD	Levin, Lin and Chu			IPS	
		none	individual intercept	in. intercept and trend	individual intercept	in. intercept and trend
ROA	0.715861 (0.4741)	-8.93573 (0.0000)	-31.3427 (0.0000)	-24.3550 (0.0000)	-10.4610 (0.0000)	-11.1931 (0.0000)
CHARACTER	-0.970247 (0.3319)	-6.67467 (0.0000)	1.239930 (0.8924)	-96.6276 (0.0000)	-2.73695 (0.0031)	-9.0e+11 (0.0000)
DEBT	0.851633 (0.4012)	-15.8839 (0.0000)	-0.07486 (0.4702)	-318,283 (0.0000)	-2.8e+14 (0.0000)	-7.1e+13 (0.0000)
WCM	1.560188 (0.1187)	-3.93235 (0.0000)	-110,476 (0.0000)	-63.4740 (0.0000)	-14.2062 (0.0000)	-5.41119 (0.0000)
ACT	1.274329 (0.2057)	-17.3259 (0.0000)	-337,830 (0.0000)	-83.5527 (0.0000)	-37.0798 (0.0000)	-1.9e+12 (0.0000)
dSIZE	-0.813611 (0.4159)	-10.8386 (0.0000)	-7.54897 (0.0000)			

Source: author's calculation based on APR data, EViews program

Note: Pesaran CD test of interdependence – H_0 : There is no interdependence; Levin, Lin and Chu unit root test – H_0 : There is an individual unit root; IPS unit root test – H_0 : There is a common unit root.

Based on the obtained results from Table 4, it can be concluded that there is no interdependence in the individual observed variables, which implies the use of unit root tests of the first generation. The authors opted for the Levin, Lin and Chu test and the IPS test, since the mentioned tests have different null hypotheses and can serve as checks against each other. Based on the conducted unit root tests (table 4), it can be claimed that all the observed variables, except the size of the company, are stationary. The variable expressing the size of the company is stationary in the first differentiator, so it will be included in the model as such.

The Hausman test shows that it is adequate to use a regression model with fixed effects. The results of the performed FE regression are presented in Table 5.

Judging by the obtained results, liquidity has no influence on the profitability of the largest companies in the processing sector in the Republic of Serbia, which implies that there is no direct connection between profitability and liquidity, as well as that there is no optimal amount of cash and cash equivalents that would enable the maximization of the net return on assets.

Table 5: Estimated regression model with fixed effects

Variables	Coefficient	Probability
c	0.049238	0.0001
CHARACTER	0.005319	0.4263
DEBT	-0.005652	0.0001
WCM	-6.01e-05	0.4351
ACT	0.005794	0.0007
dSIZE	0.302544	0.0000
Effect specification		
R-squared		0.688366
Adjusted R-squared		0.575246
F-statistic		6.085280
Prob (F-statistic)		0.000000

Source: author's calculation based on APR data, EViews program

Profitability, expressed by the ROA indicator, is not even related to the length of the business cycle of the observed companies. On the other hand, the higher indebtedness of companies in the processing sector in the Republic of Serbia negatively affects the profitability of the company, while the faster capital turnover and larger company assets have a positive impact on the net return on assets in the observed period.

Conclusion

There is no single opinion on the relationship between the company's liquidity and profitability. According to one approach, the relationship between the two variables is negative, since higher liquidity requires a higher level of opportunity costs and discourages new investment. However, some authors claim that this relationship is present only when two variables are observed in the short term. In the long and medium term, liquidity and profitability move in the same direction. In other words, companies that have liquidity problems in the medium and long term cannot be profitable. In this regard, the goal of this paper is to quantitatively determine the impact of liquidity on the profitability of 100 companies in the processing sector in the Republic of Serbia with the highest level of business income observed in a five-year period.

Initial hypotheses were formed on the basis of available theoretical and empirical literature and tested on panel data with the help of regression with fixed effects. The obtained results indicate that there is no direct connection between indicators of accelerated liquidity and net return on assets when the observed companies are concerned, which implies that it is not possible to determine the optimal amount of cash and cash equivalents that would enable the maximization of net return on assets. There is no direct connection between profitability and the length of the business cycle of the observed companies. It can be argued that a faster turnover of capital results in a higher level of profitability, as well as the growth of the

company's assets. On the other hand, higher indebtedness has negative implications for the profitability of companies in the processing sector.

The results of the conducted research have significant implications for the financial management of companies in the processing sector in the Republic of Serbia in order to make adequate business decisions when it comes to increasing profitability. The obtained results can be useful to the financial sector when making decisions on granting loans to companies in the processing sector, as well as to the competent institutions that provide support to the enterprises under review.

Suggestions for future research refer to the use of alternative measures of certain indicators of financial analysis, primarily liquidity and profitability, in order to make the obtained results even more reliable. The second suggestion refers to the extension of the observation period, since the relatively weak public availability of time series data (five-year period) of financial statements can be cited as a limitation of this study.

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